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Bryce

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(54) **SPORTING EQUIPMENT BINDING APPARATUS**

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(51) **Int. Cl.**[7] **A63C 9/00**

(52) **U.S. Cl.** **280/613**; 280/612; 280/14.22

(58) **Field of Search** ..... 280/613, 612, 280/14.22, 14.21, 634, 618, 607; 36/117.3, 131, 132, 115; 74/594.4, 594.6; 403/327, 403, 384, 397, DIG. 7

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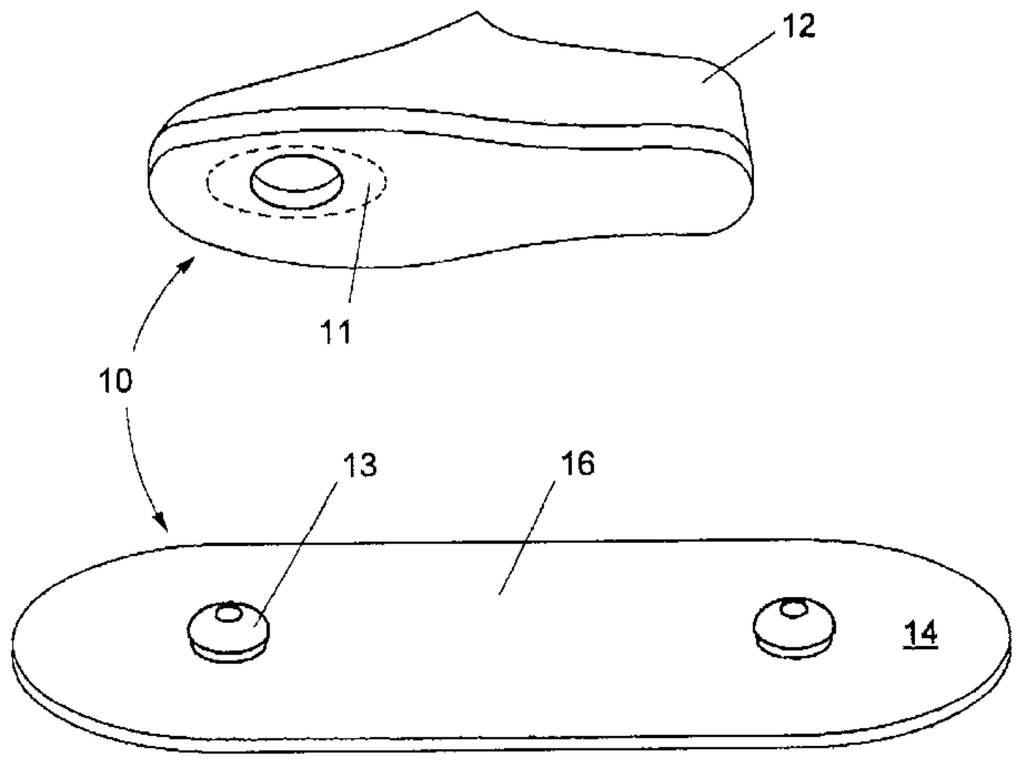
(57) **ABSTRACT**

Binding apparatus for use with an item of sports equipment, including a first part adapted for attachment to an article of footwear and a second part adapted for attachment to the item of sports equipment. The second part includes a protuberance. The first part is a housing adapted to be mounted in the sole of the article of footwear, and includes a recess adapted to receive the protuberance. The first and second parts have complementary securing parts for releasably securing the protuberance in the recess when the protuberance reaches a predetermined engagement therein for sideways pivoting movement of the article of footwear relative to the item of sports equipment. The recess has a substantially cylindrical face generally perpendicular to the sole of the article of footwear, and a lower opening defined by an inner lip for receiving the protuberance therethrough. The securing parts include an outwardly biassed ring mounted on the protuberance, the ring being compressible from a normally expanded position in which it does not pass through the lower opening to a compressed position in which it does pass through the opening. The ring may be forced through the lower opening into the recess by compressing the ring, whereupon the ring engages with the lip to retain the protuberance in the recess. The protuberance may be released from the recess upon application of a breakaway force so that the ring is forced back through the lower opening by compressing the ring.

3 Claims, 5 Drawing Sheets



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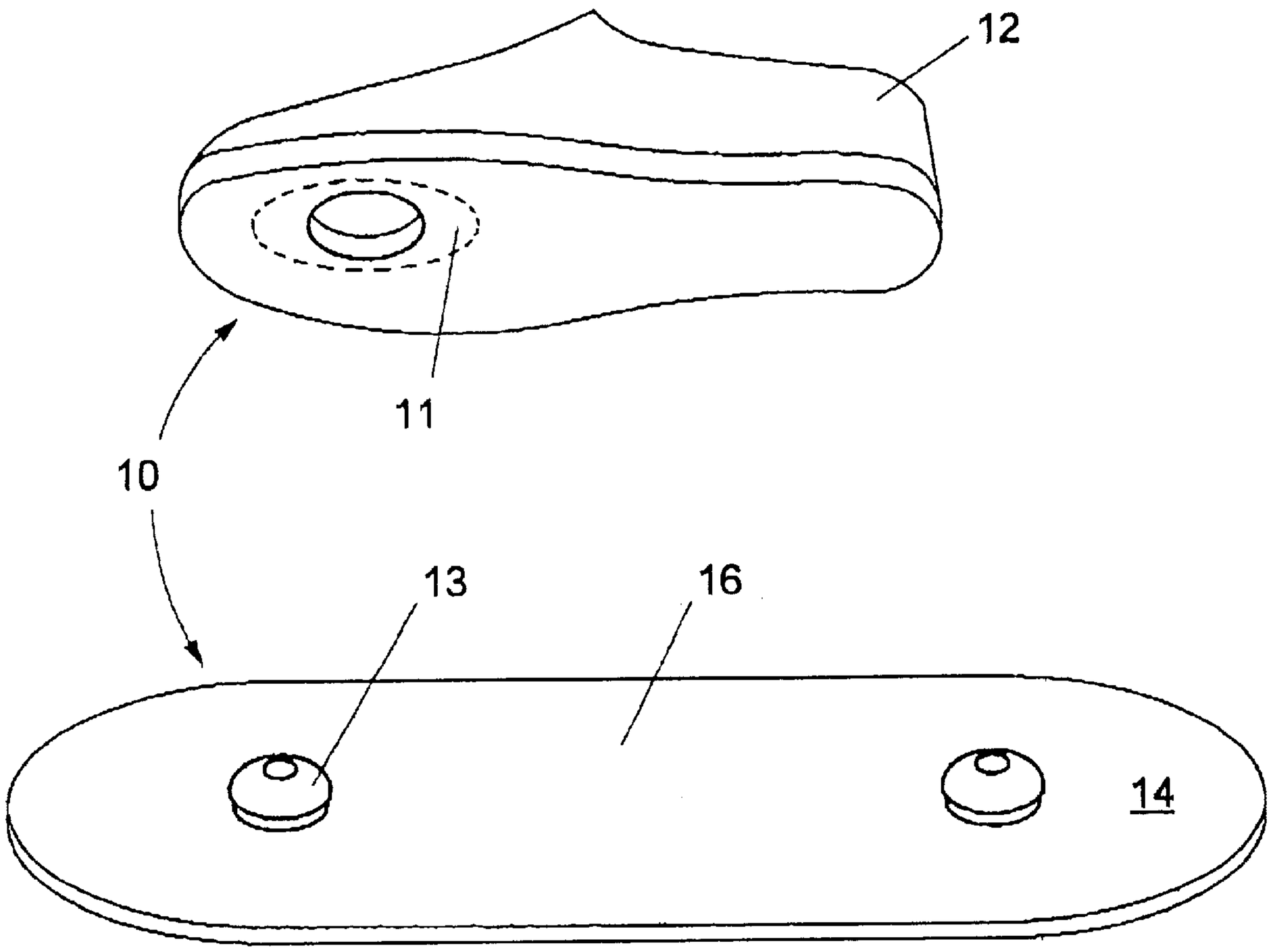

FIG. 1

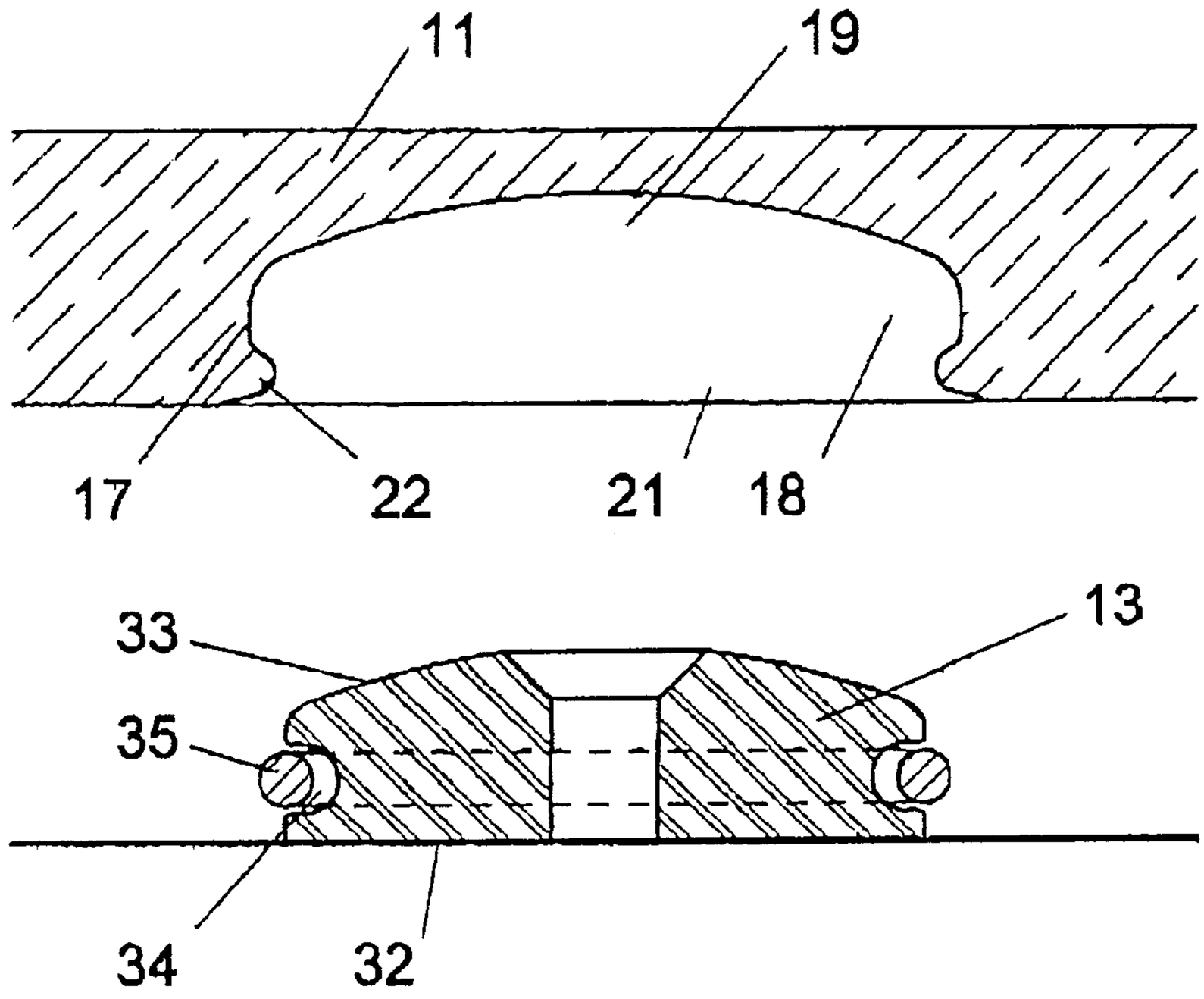

FIG. 2a

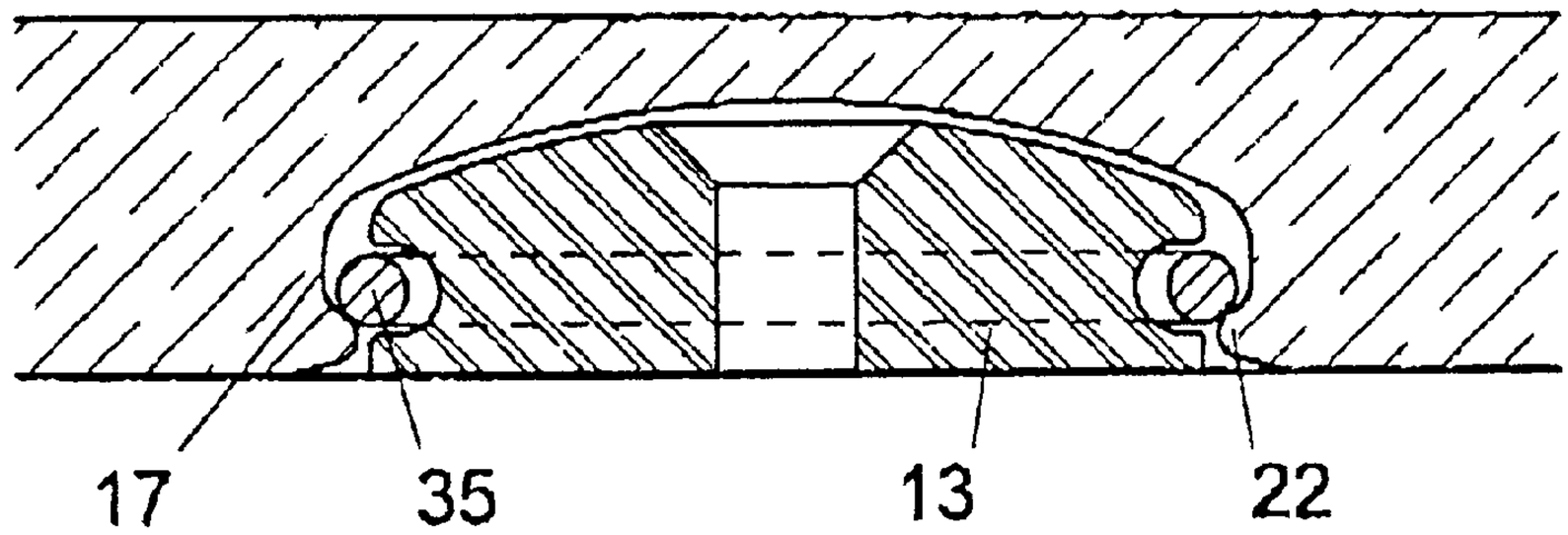

FIG. 2b

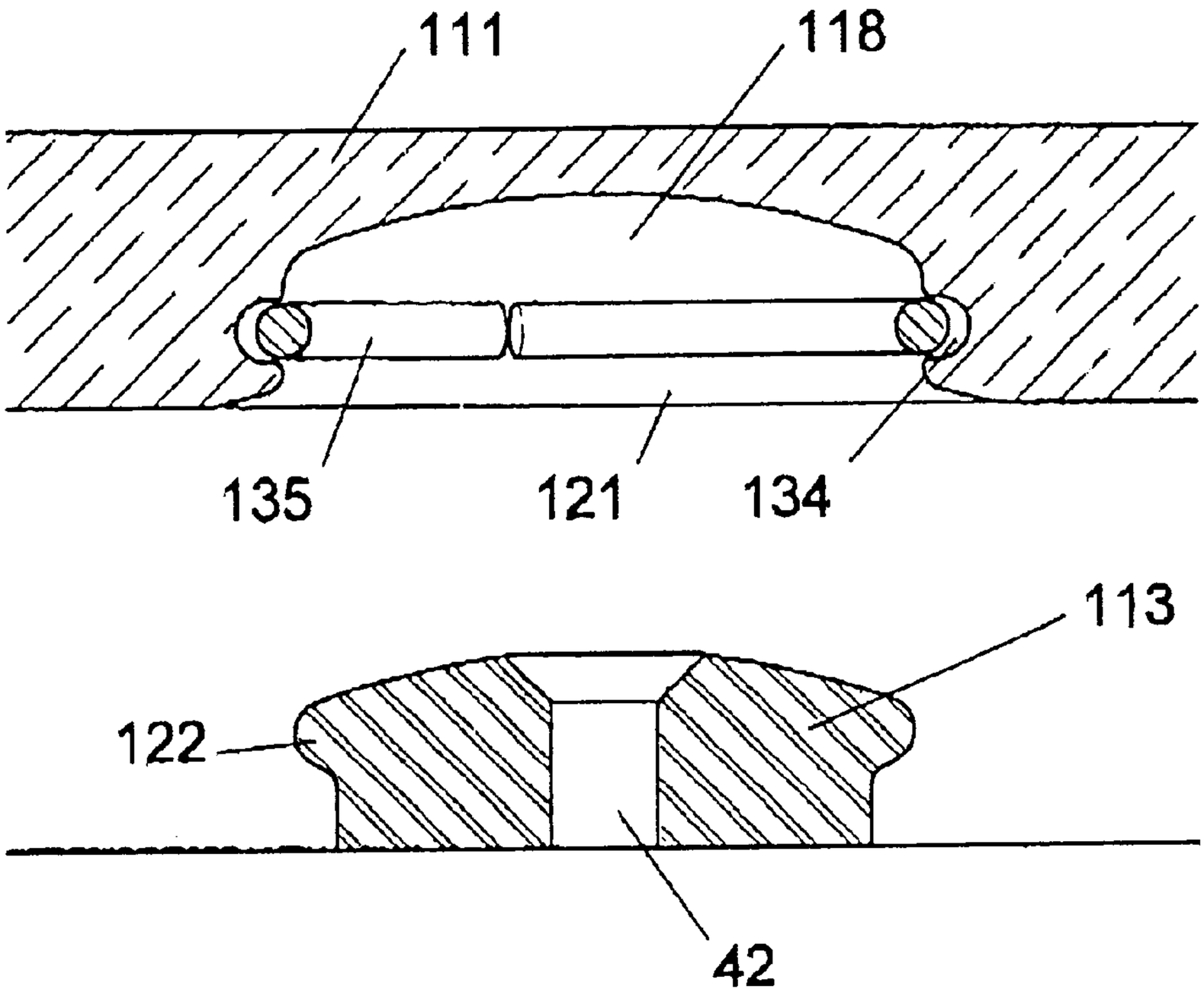

FIG. 3a

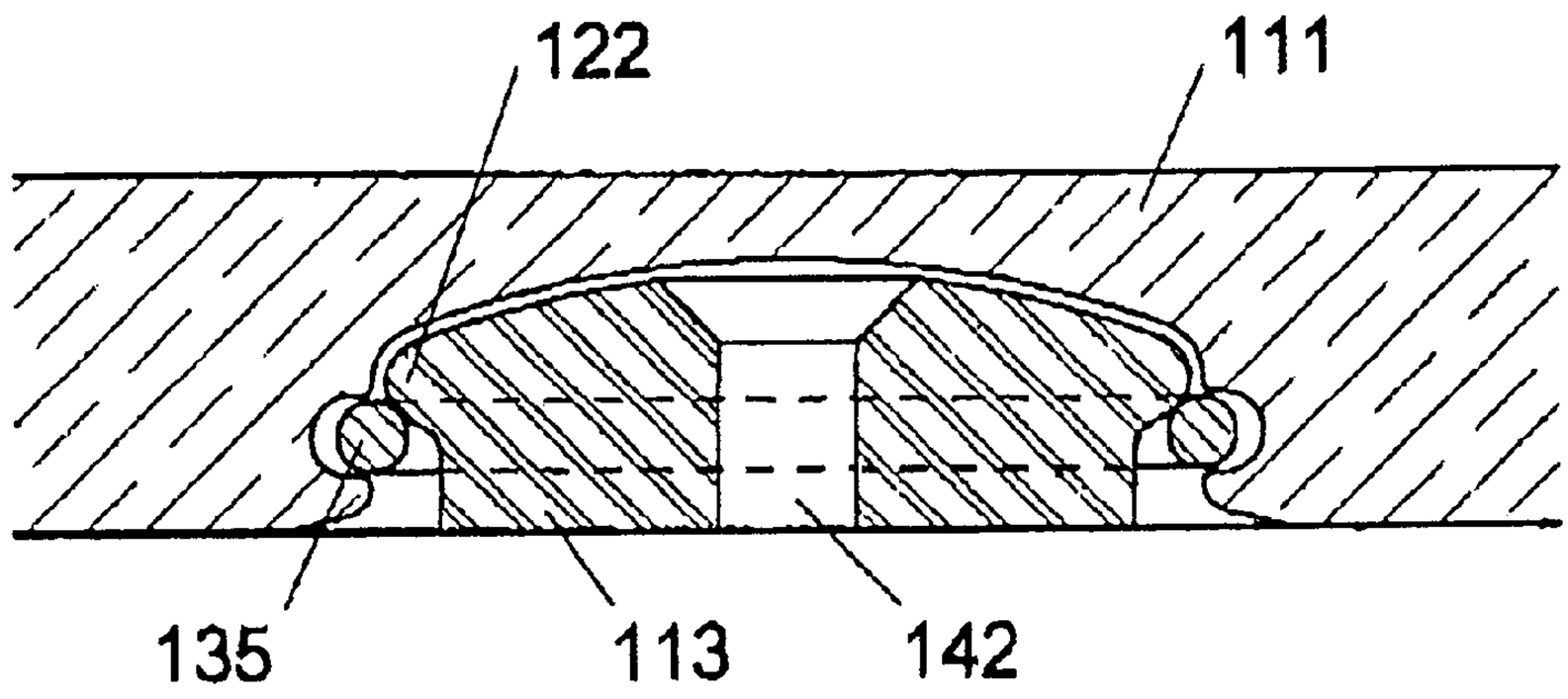

FIG. 3b

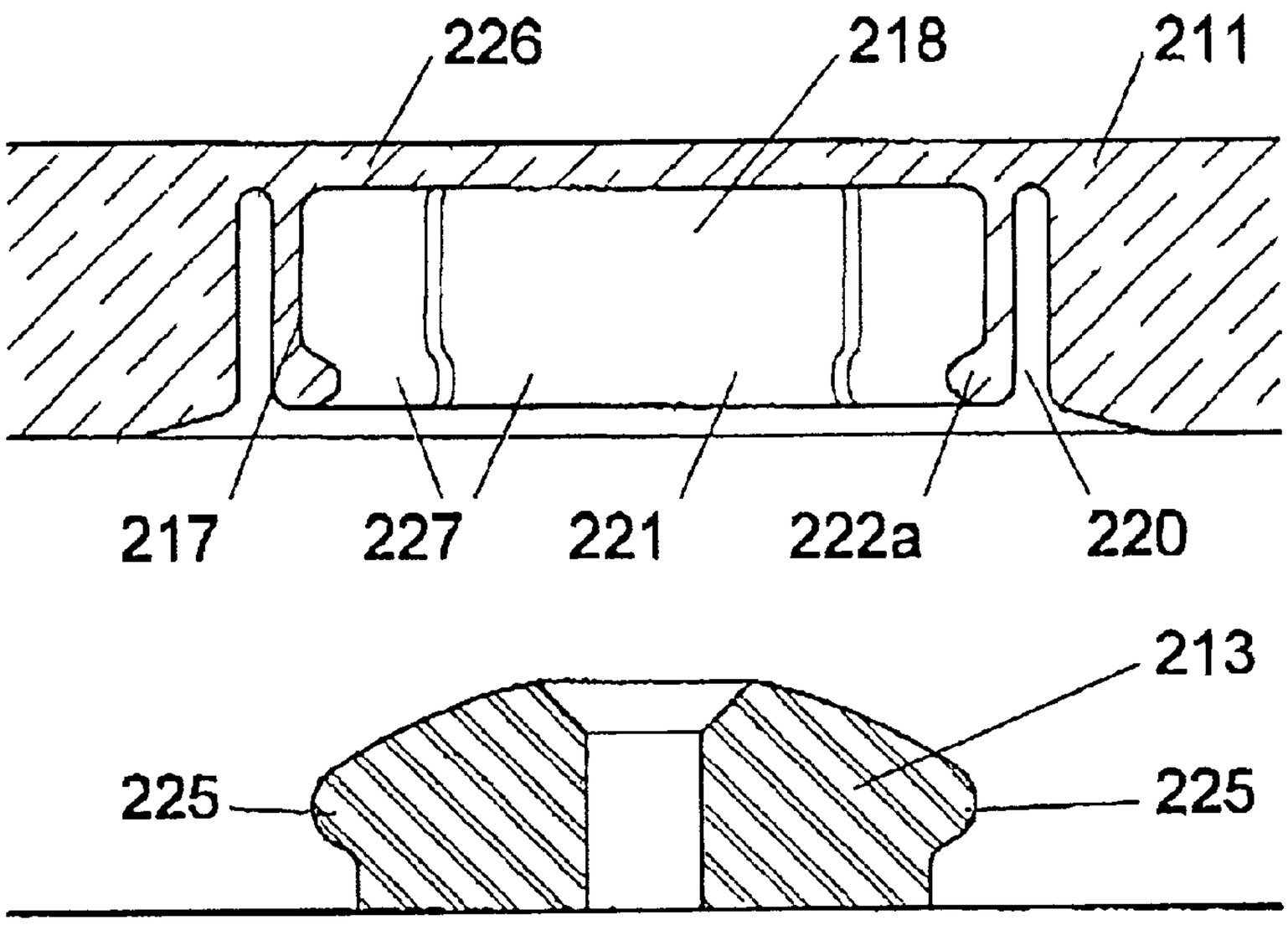
226
218
211
217
227
221
222a
220
213
225
225

FIG. 4a

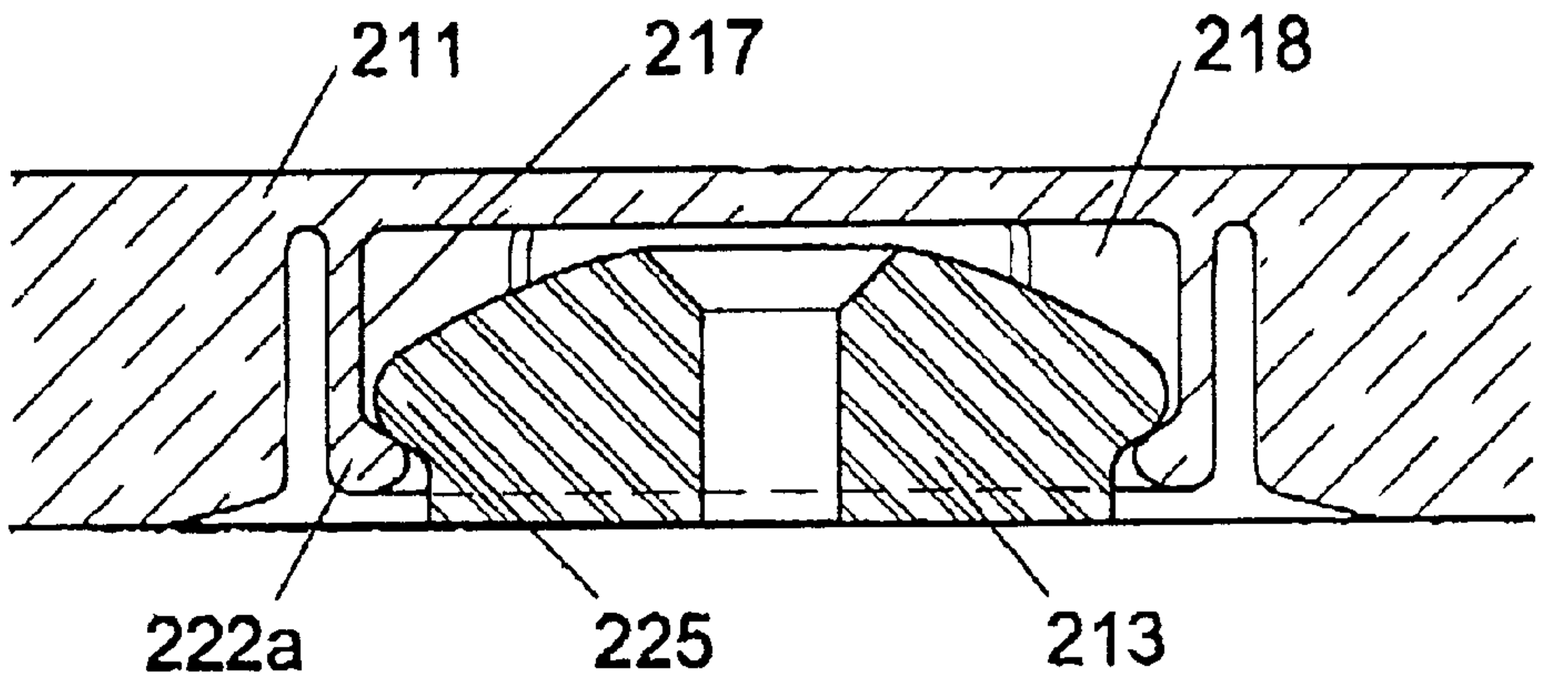
211
217
218
222a
225
213

FIG. 4b

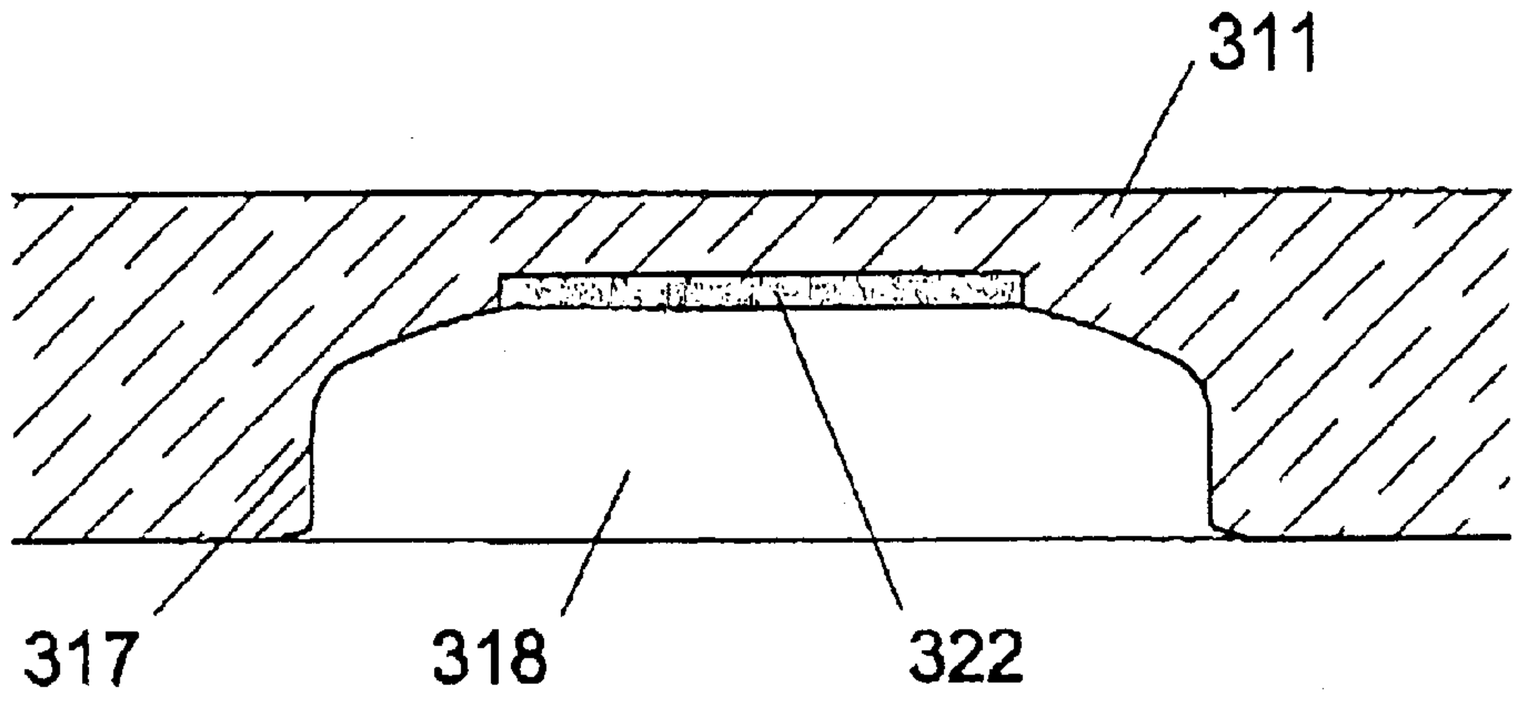

FIG. 5

SPORTING EQUIPMENT BINDING APPARATUS

TECHNICAL FIELD OF THE INVENTION

This invention relates to binding apparatus and has particular application to binding apparatus for use with items of sports equipment such as skateboards and surfboards where advantage can be gained from being releasably secured to the item of sports equipment and for illustrative purposes reference will be made to such applications. However it is to be understood that the invention could have application with other items of sports equipment such as bicycles.

BACKGROUND ART

The desirability of a user being releasably attached to an item of sports equipment has been recognised for some time as evidenced by Australian Patent Specification No. 33890/84 by Hamilton. The Hamilton specification describes apparatus for use with a surfboard, including complementary layers of interlocking hook and loop fasteners of the type known as "VELCRO" attached to the board rider's boots and the surfboard respectively. The Hamilton invention appears to have a number of drawbacks, for example, it does not seem to easily allow correct alignment of the board rider's boots with the board at a predetermined desirable position and also does not provide the rider with the opportunity to pivot his feet while riding the board. Co-pending International patent application No. PCT/AU97/00375 by the present applicant describes binding apparatus which inter alia aims to overcome these drawbacks and describes binding apparatus which includes two inter-engaging parts, one having a protuberance with a plurality of tongue members and the other having a recess with a lip and the tongue members being arranged to releasably engage the lip within the recess. The present invention is aimed at providing binding apparatus of simpler form for use with an item of sports equipment such as a skateboard or surfboard whereby the item of sports equipment may be selectively secured to and released from the persons footwear as desired. Like the aforementioned International application the invention also aims to provide binding apparatus which allows the rider to relatively easily secure his footwear to the item of sports equipment in a predetermined position and which allows the user to release himself from the sports equipment upon application of a predetermined breakaway force.

DISCLOSURE OF THE INVENTION

With the foregoing and other objects in view, the invention in one aspect resides broadly in binding apparatus for use with an item of sports equipment such as a skate board, the binding apparatus including a first part adapted for attachment to an article of footwear and a second part adapted for attachment to the item of sports equipment, said second part including a protuberance and said first part being a housing mounted in or adapted to be mounted in the sole of the article of footwear, said housing including a recess adapted to receive therein said protuberance, said first and second parts also having complementary securing means for releasably securing said protuberance in said recess upon said protuberance reaching therein a predetermined engagement for sideways pivoting movement of said article of footwear relative to said item of sports equipment, said recess having a substantially cylindrical face generally perpendicular to the sole of the article of footwear, and a lower opening defined by an inner lip adapted to receive therethrough said protuberance, said securing means including an outwardly biassed ring mounted on said protuberance, said ring being compressible from a normally expanded position in which it does not pass through said lower opening and a compressed position in which it does pass, the parts being so made and arranged that said ring may be forced through said lower opening in one direction into said recess by compressing said ring upon application of a predetermined application force whereupon said ring may engage with said lip to retain said protuberance in said recess and said protuberance may be released from said recess upon application of a predetermined breakaway force so that said ring is forced through said lower opening in the other direction by compressing said ring.

In another aspect, the invention resides broadly in binding apparatus for use with an item of sports equipment such as a skate board, the binding apparatus including a first part adapted for attachment to an article of footwear and a second part adapted for attachment to the item of sports equipment, said second part including a protuberance and said first part being a housing mounted in or adapted to be mounted in the sole of the article of footwear, said housing including a recess adapted to receive therein said protuberance, said first and second parts also having complementary securing means for releasably securing said protuberance in said recess and being adapted to releasably secure said protuberance in said recess upon said protuberance reaching therein a predetermined engagement for sideways pivoting movement of said article of footwear relative to said item of sports equipment, said recess having a substantially cylindrical face generally perpendicular to the sole of the article of footwear, and a lower opening defining an entry to said recess for receiving therethrough said protuberance, said securing means including an inwardly biassed ring mounted in a groove in said cylindrical wall portion and an outwardly extending flange on said protuberance, said ring being expandable from a normally compressed position in which the outwardly extending flange does not pass through said ring and an expanded position in which it does pass, the parts being so made and arranged that said flange may be forced into said recess through said lower opening in one direction and past said inwardly biassed ring by expanding said ring whereupon said ring may engage with said flange to retain said protuberance in said recess, and said protuberance may be released from said recess upon application of a predetermined breakaway force so that said flange is forced past said ring in the other direction by expanding said ring.

In yet another aspect, the invention resides broadly in binding apparatus for use with an item of sports equipment such as a skate board, the binding apparatus including a first part adapted for attachment to an article of footwear and a second part adapted for attachment to the item of sports equipment, said second part including a protuberance and said first part being a housing mounted in or adapted to be mounted in the sole of the article of footwear, said housing including a recess adapted to receive therein said protuberance, said first and second parts also having complementary securing means for releasably securing said protuberance in said recess upon said protuberance reaching therein a predetermined engagement for sideways pivoting movement of said article of footwear relative to said item of sports equipment, said recess having a substantially cylindrical face generally perpendicular to the sole of the article of footwear and having a lower opening defined by an inner lip for receiving therethrough said protuberance, said substantially cylindrical wall portion being comprised of a plurality of arcuate wall portions depending from an upper part of said housing, the lower ends of said arcuate wall

portions being adapted for movement radially outwardly to increase the size of said lower opening and being biassed inwardly, and an outwardly extending flange on said protuberance, the parts being so made and arranged that said flange may be forced into said recess past said inner lip by forcing said arcuate wall portions radially outwardly whereupon they engage with said flange to retain said protuberance in said recess and said protuberance may be released from said recess upon application of a predetermined break away force by forcing said arcuate wall portions radially outwardly.

In still yet another aspect, the invention resides broadly in binding apparatus for use with an item of sports equipment such as a skate board, the binding apparatus including a first part adapted for attachment to an article of footwear and a second part adapted for attachment to the item of sports equipment, said second part including a protuberance and said first part being a housing mounted in or adapted to be mounted in the sole of the article of footwear, said housing including a recess adapted to receive therein said protuberance, the first and second parts also having complementary securing means for releasably securing said protuberance in said recess upon said protuberance reaching therein a predetermined engagement for sideways pivoting movement of said article of footwear relative to said item of sports equipment, said recess having a substantially cylindrical face generally perpendicular to the sole of the article of footwear and having a lower opening defining an entry to said recess for receiving therethrough said protuberance, said securing means including a portion or part constructed of a magnetically attractant material, preferably a rare earth magnetic material mounted in said recess, and said protuberance including a portion or a part which is magnetically attractive to said magnetically attractant material, the parts being so made and arranged that the magnetic forces between said magnetically attractant material and said magnetically attractive portions or part retain said protuberance in said recess and allow pivoting of said protuberance in said recess, and said protuberance may be released from said recess upon application of a predetermined breakaway force.

Preferably, the protuberance is allowed to pivot relative to the recess through at least ninety degrees so that a rider can manipulate the item of sports equipment through a large part of the riders possible ankle movement. This is particularly important for skateboards.

It is to be understood that the terms "adapted for attachment to an article of footwear" and "adapted for attachment to the item of sports equipment" include articles of footwear and items of equipment in which the first part and second part are integrally provided respectively.

BRIEF DESCRIPTION OF THE DRAWINGS

In order that the invention may be more clearly understood and put into practical effect, reference will now be made to the accompanying drawings which illustrate preferred embodiments of the invention and wherein:

FIG. **1** is a pictorial schematic representation of various forms of binding apparatus according to the invention in use with a skateboard, with a first part being mounted in the sole of a shoe and a second part being screwed to the skateboard;

FIG. **2***a* is a cross-sectional side elevation of one form of apparatus adapted to function in the manner shown in FIG. **1** with the first part in line for assembly with the second part;

FIG. **2***b* is a cross-sectional side elevation of the modified apparatus of FIG. **2***a* with the first part engaged with the second part;

FIG. **3***a* is a cross-sectional side elevation of another form of apparatus adapted to function in the manner shown in FIG. **1** with the first part in line for assembly with the second part;

FIG. **3***b* is a cross-sectional side elevation of the apparatus of FIG. **3***a* with the first part engaged with the second part;

FIG. **4***a* is a cross-sectional side elevation of yet another form of apparatus adapted to function in the manner shown in FIG. **1** with the first part in line for assembly with the second part;

FIG. **4***b* is a cross-sectional side elevation of the apparatus of FIG. **4***a* with the first part engaged with the second part;

FIG. **5** is a cross-sectional side elevation of yet another form of apparatus adapted to function in the manner shown in FIG. **1** with the first part in line for assembly with the second part;

DETAILED DESCRIPTION OF THE DRAWINGS

The binding apparatus **10** illustrated in FIG. **1** includes a housing **11** constituting a first part of the apparatus secured within the outer sole of a shoe **12** immediately beneath the ball of a wearers foot and a dome shaped knob **13** constituting a second part of the apparatus secured to the upper face of the platform **14** of a skateboard **16**, the knob being adapted to cooperate with the housing so as to connect the skateboard to the shoe. The terms upper and lower as used herein are to be understood as being referenced to the normal standing position of a person wearing the shoe **12**.

As more clearly shown in FIGS. **2***a* and **2***b*, a recess **18** is formed in the housing **11** and has a substantially cylindrical inner wall portion **17** generally perpendicular to the sole of the shoe. The recess has an upper portion **19** and a downward facing opening **21** defined by an inner lip or flange **22** formed within the wall portion which defines an entry to the recess for receiving therethrough the knob **13** illustrated in FIG. **2***a*.

Although not shown in the embodiments illustrated, the housing **11** is moulded from a plastics material and includes flanges **23** extending sidewardly from the portion in which the recess is formed for providing an anchor about which the outer sole **24***b* of the shoe **12** is moulded to secure the housing therein similar to that illustrated in co-pending International patent application No. PCT/AU97/00375.

The knob **13** is substantially cylindrical in form having a planar lower face **32** which rests on the upper surface of the platform **14** and a domed upper face **33**. The knob is secured to the platform of the skateboard by a screw **42** located on the vertical axis and extending fully therethrough and is accessible from the domed upper face. Additionally, the head of the screw is located in a round countersunk hole in the domed upper face. It will be seen that the diameter of the knob is slightly less than the diameter of the lower opening **21** so that it can fit easily therethrough for engagement in the recess **18**.

A groove **34** is provided in the cylindrical face of the knob **13** and a ring **35** constructed of spring steel wire is seated in the groove and normally biassed to a position half in the groove and half out of the groove. The ring is toroidal in form but incomplete, that is to say, the free ends of the wire are spaced apart by a small distance to allow the ring to be compressed against its bias to locate completely within the groove. It will be appreciated that in the normally biassed position the outside diameter of the ring is greater than the diameter of the opening **21** and can engage with the inside face of the lit **22** to retain the protuberance in the recess **18** as shown in FIG. **2***b*.

In use, either one or two of the knobs **13** are secured to the platform of a skateboard in a predetermined desired position by screws **42** respectively. A rider wearing either one or a pair of shoes **12** can then fit one foot to the front knob and push off with the other foot whereupon he may wish to secure the second foot to the skateboard by the second knob. In such an arrangement, the skateboard rider would be able to perform various tricks, for example jumps, in which the skateboard would travel through the air with him and more or less effectively becoming a part of his body.

The rider would be able to release his foot or feet from the skateboard by exerting an upwardly directed breakaway force with one foot whilst holding the skateboard down with the other foot so that the lip **22** would cause the ring **35** to compress slightly towards the axis of the knob and out of securing engagement with the lip **22**. It will be appreciated that some pivoting or rocking movement coincidentally with application of the breakaway force may assist in releasing the housing **11** from the knob **13**. Such rocking movement may include rocking forwards and backwards and/or side to side.

In the following description of alternative forms of binding apparatus, corresponding numbers have been used to reference components corresponding to components of the previous apparatus, but prefaced by a "1", a "2" or a "3" respectively. The binding apparatus illustrated in FIGS. **3***a* and **3***b* is substantially an inverse arrangement of that illustrated in FIGS. **2***a* and **2***b* in that a toroidal shaped ring **135** is seated in a groove **134** provided in the inner cylindrical face **117** of the recess **118** of the housing **111**. A flange **122** is provided at the other end portion of the protuberance **113** and is adapted to engage with the ring to retain the knob in the recess as shown in FIG. **3***b*.

The knob **213** of the embodiment illustrated in FIGS. **4***a* and **4***b* is very similar to that illustrated in FIGS. **3***a* and **3***b* and has a flange **222** at its upper end portion. However, the housing **211** is significantly different and has a skirt depending from an upper wall portion **226** within an outer recess **220**, the skirt defining a recess **218** adapted to receive the knob **213**. The skirt is made up of a plurality of arcuate portions **227** having complimentary lip portions **222***a* extending radially inwardly at their lower ends to define an opening **221** for receiving the flange **225** therethrough. In use, the arcuate wall portions **227** bend radially outwardly about their upper ends within the recess **220** as the domed face of the knob engages therewith. Upon the flanges **225** passing through the opening **221** the arcuate wall portions spring back to their normally biassed position as illustrated in FIG. **4***b* to retain the knob **213** in the recess **218**.

In the binding apparatus illustrated in FIG. **5**, the housing **311** has a recess **318** provided therein and a rare earth magnet **322** is secured in the upper portion thereof in this case by an adhesive. The knob **313** is substantially cylindrical in form and has a metal disc **315** secured to its upper face and adapted to cooperate with the rare earth magnet to retain the knob in the recess.

It will of course be realised that while the foregoing invention has been described generally in relation to items of sports equipment, it has other applications where a person may wish to have his feet releasably secured to a platform or other foundation such as in construction or factory applications. Accordingly, the description has been given by way of illustrative example of the invention only and all other modifications and variations thereto as would be apparent to persons skilled in the art are deemed to fall within the broad scope and ambit of this invention as is defined in the appended claims.

What is claimed is:

1. A binding apparatus for use with an item of sports equipment, including a first part adapted for attachment to an article of footwear and a second part adapted for attachment to the item of sports equipment, said second part including a protuberance and said first part being a housing adapted to be mounted in the sole of the article of footwear, said housing including a recess adapted to receive therein said protuberance, said first and second parts also having complementary securing means for releasably securing said protuberance in said recess upon said protuberance reaching therein a predetermined engagement for sideways pivoting movement of said article of footwear relative to said item of sports equipment, said recess having a substantially cylindrical face generally perpendicular to the sole of the article of footwear, and a lower opening defined by an inner lip adapted to receive therethrough said protuberance, said securing means including an outwardly biassed ring mounted on said protuberance, said ring being compressible from a normally expanded position in which it does not pass through said lower opening and a compressed position in which it does pass, the parts being so made and arranged that said ring may be forced through said lower opening in one direction into said recess by compressing said ring upon application of a predetermined application force whereupon said ring may engage with said lip to retain said protuberance in said recess and said protuberance may be released from said recess upon application of a predetermined breakaway force so that said ring is forced through said lower opening in the other direction by compressing said ring.

2. A binding apparatus for use with an item of sports equipment, including a first part adapted for attachment to an article of footwear and a second part adapted for attachment to the item of sports equipment, said second part including a protuberance and said first part being a housing adapted to be mounted in the sole of the article of footwear, said housing including a recess adapted to receive therein said protuberance, said first and second parts also having complementary securing means for releasably securing said protuberance in said recess and being adapted to releasably secure said protuberance in said recess upon said protuberance reaching therein a predetermined engagement for sideways pivoting movement of said article of footwear relative to said item of sports equipment, said recess having a substantially cylindrical face generally perpendicular to the sole of the article of footwear, and a lower opening defining an entry to said recess for receiving therethrough said protuberance, said securing means including an inwardly biassed ring mounted in a groove in said cylindrical wall portion and an outwardly extending flange on said protuberance, said ring being expandable from a normally compressed position in which the outwardly extending flange does not pass through said ring and an expanded position in which it does pass, the parts being so made and arranged that said flange may be forced into said recess through said lower opening in one direction and past said inwardly biassed ring by expanding said ring whereupon said ring may engage with said flange to retain said protuberance in said recess and said protuberance may be released from said recess upon application of a predetermined breakaway force so that said flange is forced past said ring in the other direction by expanding said ring.

3. A binding apparatus for use with an item of sports equipment, including a first part adapted for attachment to an article of footwear and a second part adapted for attachment to the item of sports equipment, said second part including a protuberance and said first part being a housing adapted to

be mounted in the sole of the article of footwear, said housing including a recess adapted to receive therein said protuberance, said first and second parts also having complementary securing means for releasably securing said protuberance in said recess and being adapted to releasably secure said protuberance in said recess upon said protuberance reaching therein a predetermined engagement for sideways pivoting movement of said article of footwear relative to said item of sports equipment, said recess having a substantially cylindrical face generally perpendicular to the sole of the article of footwear, and having a lower opening defined by an inner lip for receiving therethrough said protuberance, said substantially cylindrical wall portion being comprised of a plurality of arcuate wall portions depending from an upper part of said housing, the lower ends of said arcuate wall portions being adapted for movement radially outwardly to increase the size of said lower opening and being biassed inwardly, and an outwardly extending flange on said protuberance, the parts being so made and arranged that said flange may be forced into said recess past said inner lip by forcing said arcuate wall portions radially outwardly whereupon they engage with said flange to retain said protuberance in said recess and said protuberance may be released from said recess upon application of a predetermined breakaway force by forcing said arcuate wall portions radially outwardly.

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